

Bitterroot Elk Project Progress Report

Fall 2013

Montana Fish, Wildlife and Parks and the University of Montana are now in the last year of a three-year project investigating the influence of predation, habitat, and nutrition on elk population dynamics in the southern Bitterroot Valley. This summer, neonate calf survival rates are the highest observed during the past 3 years. During the upcoming fall and winter, we will continue to monitor the third and final cohort of adult elk and elk calves, and document cause-specific mortality until next May.



Adult Elk Survival – Year 3

During the winter of 2012-2013, we captured and collared 41 adult female elk. To date, three of these elk have died. One West Fork elk was killed by a mountain lion in March, one West Fork elk was killed by an unknown predator during April, and one West Fork elk died of natural causes just after giving birth in early June. Of the 20 elk captured in the East Fork area, eight have migrated to the upper Big Hole. The remaining elk will be monitored until their collars drop off in January 2014. The Kaplan-Meier survival estimate from winter 2012-2013 through September 1 was 0.93. Annual adult survival rate was 0.84 in 2011 and 0.95 in 2012.

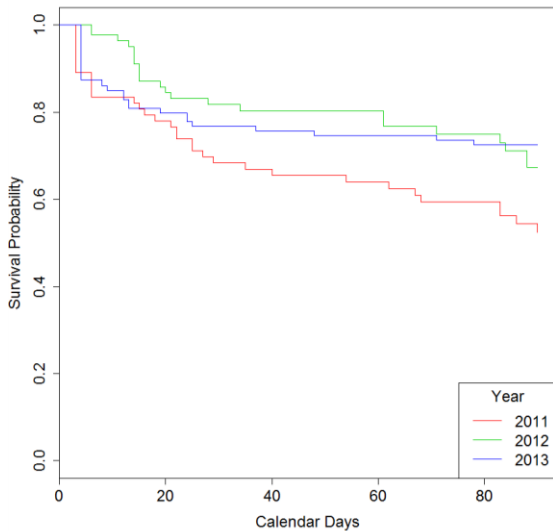
Elk Calf Survival – Year 3

The third year of the elk calf survival study is underway. From May 27– June 16, 2013, project staff and volunteers captured newborn calves in the East Fork and West Fork areas of the Bitterroot, and in the Upper Big Hole Valley. Prior to the start of the calf capture, many of the radiocollared adult female elk migrated to the Big Hole, so we included this area in our capture efforts to mark calves from within the entire East Fork elk herd calving range.

We captured a total of 84 elk calves, 42 in the West Fork area and 42 in the East Fork and upper Big Hole. A new design of ear tag was deployed this year and has been very effective. There have been 5 ear tag failures. Field staff have monitored calves daily throughout the summer and collected detailed mortality investigations at each mortality event. Of the 79 known-fate calves, 64 are alive and 15 are dead. Of the 15 documented mortalities, mortality sources include lion predation ($n = 5$), black bear predation ($n = 3$), natural-non predation causes ($n = 2$), unknown causes ($n = 4$), and 1 mortality case is pending DNA confirmation of predator



species. DNA evidence gathered from scat and hair at the mortality sites provides stronger evidence in pending cases where some level of uncertainty existed in the mortality source. The natural, non-predation related mortality causes included one calf that died of malnutrition and another that died from impact trauma (possibly from a vehicle collision or a fall).

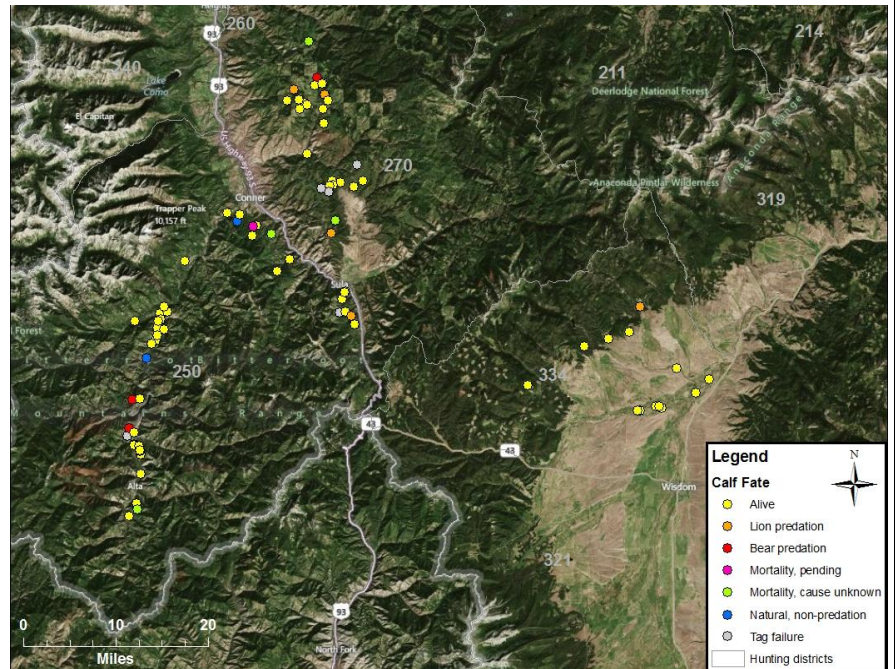


The Kaplan-Meier survival estimate during the first 90 days of sampling was 0.73 in

2013, the highest survival rate recorded during the past three years (2011= 0.53, 2012 = 0.67). Over all three years, males had an 85.0% greater risk of mortality than females over the first 90 days of sampling, and this difference did not vary by the study year. In 2013, the Kaplan-Meier survival estimate during the first 90 days of sampling was 0.61 for male calves and 0.87 for female calves.

Mountain Lion Population Research

During the winter of 2012-2013, we initiated a project to estimate mountain lion density using DNA-based mark-recapture methodology. The study area included HD 250, HD 270 and a small portion of HD 240. The estimated lion density and observed lion-caused elk mortality rate will be used in our elk population modeling efforts to quantify the effects of lion predation on elk population dynamics, and to develop predictions as to elk population dynamics given lower or higher lion densities. Winter field teams worked with houndsmen to tree mountain lions and collect DNA samples using biopsy darting. DNA laboratory results to date confirmed a minimum of 67 individual mountain lions (42 female and 25 male) using the study area during the winter and early spring of 2012-2013. Five of these 67 individuals were subadult lions sampled with their mothers. Results of four additional samples, collected from mountain lions harvested in HD 250 and HD 270, are still pending DNA analysis.



2013 calf capture locations and calf fate as of September 1, 2013.



Elk Habitat and Vegetation Monitoring

We continued the elk summer range nutrition study and vegetation sampling during summer 2013. This work has three main components: 1) assessing elk diet during summer and winter by collecting elk pellet samples, 2) assessing elk forage biomass availability across different landcover types during the peak of the growing season in July/August, and 3) assessing forage plant phenology during the growing season from April to October.



Preliminary elk diet analysis of the summer 2012 samples was completed by the Washington State University Wildlife Habitat Nutrition Lab (see Table). Dominant forbs included *Balsamorhiza sagitata*, and *Lupinus spp.*, dominant grasses included *Pseudoroegneria*, *Poa spp.*, *Festuca altaica*, *Festuca idahoensis*, *Stipa spp.*, and *Bromus spp.*, and dominant shrubs included *Mahonia repens* (leaf), *Salix spp.*, *Shepherdia*, and *Vaccinium spp.*

During summer 2012, we sampled 91 locations throughout the study area to survey vegetation and biomass. These locations were chosen based on landcover classes throughout our study region including recent burns, agriculture and ranch land, seasonal wetlands, grasslands, and closed canopy forests. At these locations, we surveyed all vegetation along a 30 m transect, gathering information about both understory and overstory vegetation. We identified all species, measured shrub and tree density, and recorded other characteristics of each location, including landcover type. To sample biomass, we quantified ground cover classes within a 0.5 m² quadrat, then cut all live and dead vegetation within the quadrat. We weighed the sample in the field and then weighed it again after drying to quantify the amount of biomass in an area. Our goal during summer 2013 was to sample another 95 locations, and sampling is still underway.

	East Fork Samples	West Fork Samples
Forbs	16.1%	16.0%
Grasses	38.5%	32.6%
Sedges/Rush	19.5%	26.1%
Conifers	6.5%	9.5%
Shrubs	19.1%	15.8%

Elk diet analysis results from pellet samples collected during summer 2012. Seven composite samples of 20 pellets were collected in the East Fork area and seven composite samples were collected in the West Fork area. Additional samples were collected during summer 2013.

Acknowledgements

We thank the landowners that have allowed access for fieldwork and provided logistical support, and the organizations and individuals that have provided financial support for this project : Ravalli County Fish and Wildlife Association, Montana Bowhunters Association, Hellgate Hunters and Anglers, Rocky Mountain Elk Foundation, Safari Club International Foundation, Montana Outdoor Legacy Foundation, Western Montana Chapter of the Safari Club, the Shikar-Safari Club International Foundation, the Pope and Young Club, Montana Mapping & GPS, McIntire-Stennis Foundation (USDA), NASA, the U. S. Forest Service, the MPG Ranch, and private donations from individuals in the community. This work was supported by the National Science Foundation EPSCoR program under Grant # EPS-1101342 within the Montana Institute on Ecosystems. Funding was provided by revenues from the sale of Montana hunting and fishing licenses and matching Federal Aid in Wildlife Restoration grants to Montana Fish, Wildlife and Parks. To learn more, please visit our website: <http://fwp.mt.gov/fishAndWildlife/management/elk/bitterroot/default.html>

